

## CLAIMS

1. In a design method of a Fermi-antenna with corrugation that has a broadband and circular directivity which are necessary for the reception imaging of millimeter-wave, a design method of a Fermi-antenna comprising the steps of:

setting an H-plane beam width to be a beam width having a directivity of target by changing a point of infection of a Fermi-Dirac function that is a taper function of said Fermi-antenna; and

setting an E-plane beam width to be said beam width having the directivity of target by changing an aperture width of said Fermi-antenna,

wherein wideband and circular directivity are realized.

2. In a design method of a Fermi-antenna with corrugation that has a broadband and circular directivity which are necessary for the reception imaging of millimeter-wave, a design method of a broadband Fermi-antenna comprising the steps of:

a step which gives a center frequency of broadband frequencies or a corresponding wave-length;

a step which determines an effective thickness of a dielectric substrate of said Fermi-antenna;

a step which determines a length of antenna of said Fermi-antenna;

a step which determines a width, pitch and height of said corrugation of said Fermi-antenna;

a step which determines parameters of Fermi-Dirac function that form a taper shape of said Fermi-antenna;

a step which sets up target values of beam widths of an H-plane and E-plane of an electromagnetic-wave that is radiated from said Fermi-antenna;

an H-plane beam width comparative step which compares said H-plane beam width with said preset target value of H-plane beam width after a point of infection of said Fermi-antenna was set optionally;

an H-plane beam width decision cycle which repeats again the step that compares said H-plane beam width with said preset target value of H-plane beam width after having changed a position of the point of infection when it does not accord with said target value in said H-plane beam width comparative step;

a step which sets up an aperture width of said Fermi-antenna when the H-plane beam width has accorded with the preset H-plane beam width in said H-plane beam width comparative step;

an E-plane beam width comparative step which compares the E-plane beam width of an electromagnetic-wave that is radiated on the basis of said set aperture width with said preset target value of E-plane beam width; and

an E-plane beam width decision cycle which repeats again the step that compares said E-plane beam width with said preset target value of E-plane beam width by changing the aperture width when it does not accord with said target value in said E-plane beam width comparative step,

wherein

it is designed so that both of said H-plane beam width and said E-plane beam width have almost equal circular directivities.

3. In a program for designing a Fermi-antenna with corrugation that has a broadband and circular directivity which are necessary to the reception imaging of millimeter-wave, a program for designing a broadband Fermi-antenna executing:

a procedure which gives a center frequency of broadband frequencies or a corresponding wave-length;

a procedure which determines an effective thickness of a dielectric substrate of said Fermi-antenna;

a procedure which determines a length of antenna of said Fermi-antenna;

a procedure which determines a width, pitch and height of said corrugation of said Fermi-antenna;

a procedure which determines parameters of Fermi-Dirac function that form a taper shape of said Fermi-antenna;

a procedure which sets up target values of beam widths of an H-plane and E-plane of an electromagnetic-wave that is radiated from said Fermi-antenna;

a procedure which compares said H-plane beam width with said preset target value of H-plane beam width after a point of infection of said Fermi-antenna was set optionally;

a procedure which repeats the procedure that compares said

H-plane beam width with said target value of H-plane beam width after having changed a position of said point of infection when said H-plane beam width does not accord with said target value, and which sets up an aperture width of said Fermi-antenna when the H-plane beam width has accorded with the preset H-plane beam width in said procedure that compares said H-plane beam width;

a procedure which compares the E-plane beam width of an electromagnetic-wave that is radiated on the basis of said set aperture width with said preset target value of E-plane beam width; and

a procedure for designing it so that both of said H-plane beam width and said E-plane beam width have almost equal circular directivities, by repeating the procedure which compares said E-plane beam width with said preset target value of E-plane beam width by changing said aperture width in said procedure that compares the E-plane beam width.

4. In a recording medium which recorded a program for designing a Fermi-antenna with corrugation that has a broadband and circular directivity which are necessary for the reception imaging of millimeter-wave, a recording medium recorded with a program for designing a broadband Fermi-antenna which execute:

a procedure which gives a center frequency of broadband frequencies or a corresponding wave-length;

a procedure which determines an effective thickness of a

dielectric substrate of said Fermi-antenna;

a procedure which determines a length of antenna of said Fermi-antenna;

a procedure which determines a width, pitch and height of said corrugation of said Fermi-antenna;

a procedure which determines parameters of Fermi-Dirac function that form a taper shape of said Fermi-antenna;

a procedure which sets up target values of beam widths of an H-plane and E-plane of an electromagnetic-wave that is radiated from said Fermi-antenna;

a procedure which compares said H-plane beam width with said preset target value of H-plane beam width after a point of infection of said Fermi-antenna was set optionally;

a procedure which repeats the procedure that compares said H-plane beam width with said target value of H-plane beam width after having changed a position of said point of infection when said H-plane beam width does not accord with said target value, and which sets up an aperture width of said Fermi-antenna when the H-plane beam width has accorded with the preset H-plane beam width in said procedure that compares said H-plane beam width;

a procedure which compares the E-plane beam width of an electromagnetic-wave that is radiated on the basis of said set aperture width with said preset target value of E-plane beam width; and

a procedure for designing it so that both of said H-plane beam

width and said E-plane beam width have almost equal circular directivities, by repeating the procedure which compares said E-plane beam width with said preset target value of E-plane beam width by changing said aperture width in said procedure that compares the E-plane beam width.